UNTANGLING THE KNOT: AN INNOVATIVE TECHNIQUE TO LEFT PARADUODENAL HERNIA REPAIR

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Introduction

Paraduodenal hernias, constituting 53% of congenital internal hernias, present a diagnostic and therapeutic challenge due to their rare occurrence and complex anatomy. Less than 1-2% of all small bowel obstructions are attributed to these hernias, with a significant risk of complications such as strangulation and bowel ischemia.[1] The anatomical basis for these hernias is the fossa of Landzert, an embryological anomaly resulting from the non-fusion of the descending mesocolon with the posterior parietal peritoneum. This study focuses on a left paraduodenal hernia case, which represents 75% of such hernias and predominantly affects young males (male-to-female ratio of 3:1) without previous abdominal surgeries.[2] Given the 50% lifetime risk of incarceration/strangulation and recurrent obstructive symptoms, surgical intervention is indicated upon diagnosis. While open surgery has been traditional, emerging evidence suggests that minimally invasive approaches can be effective, albeit challenged by dense adhesions and entrapment of the proximal jejunum.[3] This report reviews the anatomy, radiological findings, and introduces an innovative surgical technique, advocating for a standardized surgical approach in the literature.

Case Description

A 31-year-old female-to-male patient with no past medical or surgical history presented with acute, severe epigastric abdominal pain, nausea, and vomiting. The pain was colicky, diffuse, and rated 10/10, lasting 6-8 hours pre-admission. Initial examination showed a tender abdomen without peritonitis. Labs indicated lactate of 2.3 mmol/L and WBC of 16,000/mm³. CT imaging suggested a nonspecific volvulus or internal hernia with mesenteric vessel congestion but no bowel obstruction. Upon surgical team review, there was suspicion of a left paraduodenal hernia, and the decision was made to perform diagnostic laparoscopy.

A diagnostic laparoscopy confirmed a left paraduodenal hernia; the hernial sac contained a majority of the small bowel without vascular compromise. The bowel was reduced laparoscopically to the presumed ligament of Treitz. The fossa of Landzert was closed with a 3-0 absorbable, barbed suture, ensuring bowel viability. The patient had an uneventful recovery, tolerated diet, pain resolved, passing flatus, and was discharged on postoperative day 1.

Case Description

On postoperative day 2, the patient returned with similar symptoms. A repeat CT showed a recurrent left paraduodenal hernia. After discussion of the case, the patient opted for an open repair, revealing a recurrent left paraduodenal hernia with significant adhesions entrapping 20 cm of proximal jejunum. The hernial sac was meticulously dissected, and the incarcerated jejunal loops were freed. The defect was closed using multiple interrupted 3-0 silk sutures, securing the duodenojejunal flexure within the descending mesocolon. These radially oriented simple interrupted sutures were used to essentially recreate the ligament of Treitz without sacrificing the inferior mesenteric vein (IMV), or risking stenosis of the duodenojejunal junction.

Following this repair, the patient's recovery was favorable. They were gradually transitioned to a regular diet, and the patient was discharged uneventfully on postoperative day 2. The patient remains in good health upon follow up in the clinic several weeks later.

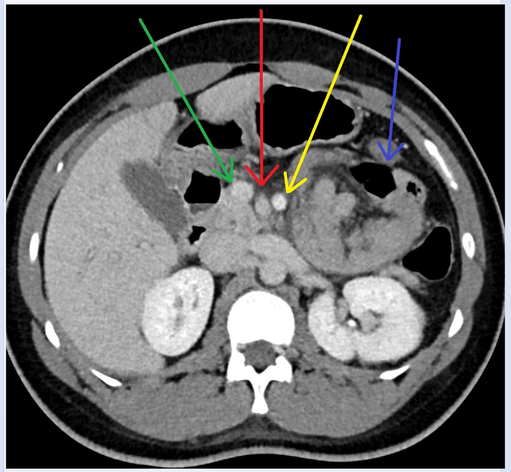


Figure 1. Clustered sac of small bowel loops (blue arrow) located posterolateral to the Inferior Mesenteric Vein (yellow arrow), with the Superior Mesenteric Vein (green arrow) and Superior Mesenteric Artery (red arrow) indicated for reference.

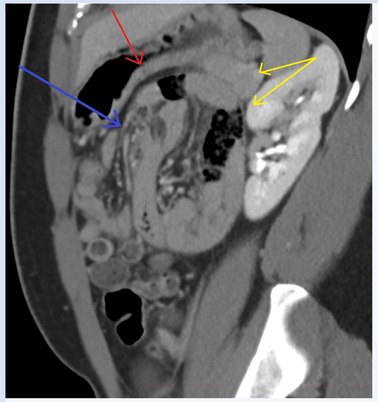


Figure 2. Cluster of proximal jejunal loops within the fossa of Landzert (blue arrow). An anomalous space which on first glance may appear to be within the lesser sac, seen displacing the stomach ventrally (red arrow), and abutting the retroperitoneal structures; pancreas and left kidney (yellow arrows).

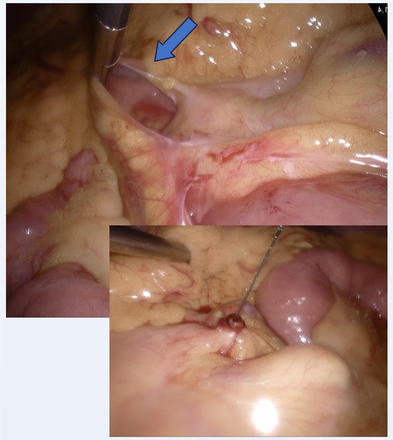


Figure 3. Fossa of Landzert seen above retracted ventrally, with the IMV seen at the medial extent, indicated by the arrow. Seen below is the repair with running 3-0 absorbable, barbed suture.

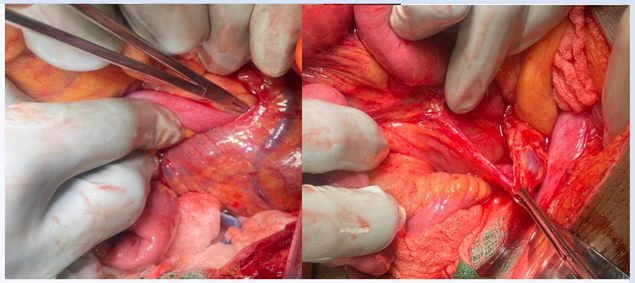


Figure 4. Fossa of Landzert before reduction (left), and after reduction (right).

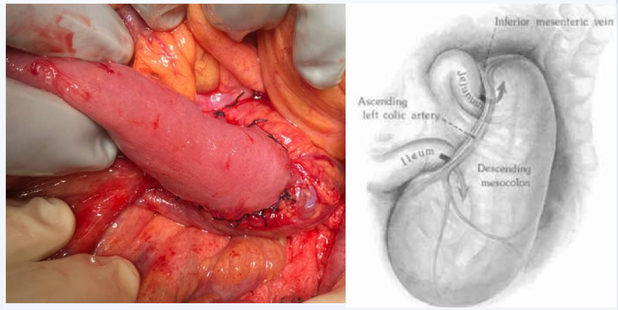


Figure 5. Radially oriented repair at the duodenojejunal flexure which recreates the ligament of Treitz (left).
Diagram depicting the anatomy of a left paraduodenal hernia (right). [4]*

Discussion

Left paraduodenal hernias and their associated high rate of complications necessitate prompt surgical intervention. The repair techniques of this rare pathology lack standardization. The prevalent methods include closing the defect after bowel reduction or extensively opening the defect's neck along a plane to the right of IMV. The latter technique transforms the fossa of Landzert into an extension of the peritoneal cavity, eliminating the constricted neck that predisposes to strangulation. Among the limited literature, defect closure is often cited as the safest and most common repair method.[3] Extensive opening of the defect is considered when hernial contents cannot be reduced due to adhesions, though this approach carries the risk of damaging the IMV and ascending left colic artery, potentially leading to bowel ischemia.

Opening the neck may facilitate access for lysis of adhesions around the incarcerated bowel. Conversely, defect closure can be achieved by suturing the peritoneal layer adjacent to the IMV directly to the posterior parietal peritoneum, carefully avoiding retroperitoneal structures. In our case, we reconstructed the ligament of Treitz by circumferentially attaching the descending mesocolon to the fixed duodenojejunal flexure. The single most important concept in the repair is the intimate knowledge of the anatomy and presence of the major vasculature to be preserved The literature indicates that, barring the suspicion of complications such as bowel necrosis, a laparoscopic approach is favored for the advantages of a successful minimally invasive repair. Nevertheless, surgeons must be keenly aware of the anatomical complexities and the potential for dense adhesions in the proximal jejunum within the fossa of Landzert, which might necessitate a conversion to open or robotic techniques. Such a conversion aims for superior exposure, ensuring thorough adhesiolysis and meticulous defect closure.

Conclusion

This case underscores the diagnostic challenges and surgical management complexities associated with left paraduodenal hernias. Prompt recognition and appropriate surgical intervention are essential for a successful outcome. It also highlights an innovative technique for repair which is not well standardized in the management of this pathology. This case also highlights the potential need for open repair in cases of recurrent hernias with dense adhesions where an incarcerated loop of trapped proximal jejunum can masquerade as the ligament of Treitz, resulting in inadequate lysis of adhesions for the unwary during a laparoscopic approach. Future studies on the management of this very rare condition can contribute to improved outcomes for affected patients.

References

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4. * Image courtesy of 'Identification and Repair of Left-Sided Paraduodenal Hernia Using Both Laparoscopic and Robotic Techniques' by Muhonen John, Hsu Michael, Sturdivant Matthew, Unger Anthony, Dexter David, Giuseppucci Pablo, Esper Christopher, published in Case Reports in Surgery, 2020, Vol. 2020, Article ID 7569530, 6 pages. Available under Creative Commons License (CC BY 4.0) DOI: 10.1155/2020/7569530.

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